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EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1764

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/828,225

Applicant(s)

ALLISTON ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2005 and 26 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 4,5,7-14 and 17-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4,5,7-12,14,17,19-21 and 23-26 is/are rejected.
- 7) ☒ Claim(s) 13,18 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 18, 2005 has been entered.

### ***Response to Amendment***

2. Applicant's amendment submitted on July 18, 2005 and applicant's supplemental amendment submitted on July 26, 2005 have been received and carefully considered. Claims 1-3, 6, 15 and 16 are cancelled. Claims 4, 5, 7-14 and 17-26 remain active.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 4, 5, 7-14 and 17-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 24, it is unclear as to the structural limitation applicant is attempting to recite by, "the at least one inlet chamber extends in a vertical direction and ends in an open inlet which is open in the horizontal direction and located at the top of the inlet chamber inside the furnace," in lines 26-28, because it is unclear as to what is meant by an inlet being "open in the horizontal direction." According to Applicant's specification (page 7, lines 12-14, and FIG. 3, 7,

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8), "The inlet **22** of the inlet chamber **7** is substantially or totally open in the horizontal direction to allow the particles freely to enter the inlet chamber **7**." As best interpreted by the Examiner, it appears that the limitation of "open in the horizontal direction" means having an opening that is within in the horizontal plane.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 5, 7-10, 12, 14, 17, 19-21 are 23-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Dietz (US 5,299,532).

Regarding claim 24, Dietz (FIG. 1-4) discloses a system including at least one process chamber (i.e., compartment **92a**, **92b**, **96a**, **96b** within recycle section **32a**, **32b**) in connection with a fluidized bed reactor, wherein the process chamber **92a**, **92b**, **96a**, **96b** comprises: an interior limited by side walls having a lower part and an upper part (i.e., partitions **68a/b**, **88a/b**, **90a/b**; FIG. 2), wherein the interior enables a flow of solid material; heat exchanger means (i.e., bank of tubes **104a**, **104b**; column 6, lines 25-29) within the interior; a top closed barrier wall forming a roof of the process chamber (i.e., upper portion **24a''**, **24b''**; column 3, line 55 to column 4, line 7; also partition **78a**, **78b**; column 5, lines 48-54); a process chamber inlet (i.e., opening **112a/b**, **114a/b**; column 6, lines 30-47; FIG. 4) arranged in the lower part of one of the side walls (i.e., partitions **88a/b**, **90a/b**; FIG. 2); and a process chamber outlet (i.e., openings **106a/b**, **110a/b**; column 6, lines 30-47; FIG. 4) arranged

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in the upper part of one of the side walls (i.e., partitions **68a/b**);  
wherein the fluidized bed reactor comprises:  
a furnace (i.e., comprising furnace sections **30a, 30b**) and furnace walls limiting the furnace (i.e., walls **14a/b, 16a/b, 17a/b**), wherein the at least one process chamber **92a, 92b, 96a, 96b** is located inside the furnace of the fluidized bed reactor adjacent to at least one wall of the furnace walls (e.g., walls **16a/b**); and  
at least one inlet chamber (i.e., compartment **94a, 94b**; column 8, lines 11-28; FIG. 2, 4) for directing solid material to the process chamber inlet **112a, 112b, 114a, 114b**, wherein the inlet chamber **94a, 94b** is disposed prior to the process chamber **92a, 92b, 96a, 96b** in the direction of flow of the solid material, and wherein the inlet chamber **94a, 94b** extends in a vertical direction and ends in an open inlet (i.e., as can be seen in FIG. 4, each inlet chamber **94a, 94b** substantially defines a rectangle without a top) that allows particles of the solid material to freely enter the inlet chamber (i.e., from the outlets of external conduits **58a, 58b**, carrying solid material from separators **40a, 40b**; FIG. 1, 2).

In view of the newly added limitations, the open inlet of the inlet chamber **94a, 94b** is further “open in the horizontal direction”, according to Applicant’s specification. The specification (page 7, lines 12-14) recites, “The inlet **22** of the inlet chamber **7** is substantially or totally open in the horizontal direction to allow the particles freely to enter the inlet chamber **7**.” As best understood, it appears that the limitation of “open in the horizontal direction” means having an opening that is defined within the horizontal plane (see FIG. 3, 7, 8). Thus, the open top of the inlet chamber **94a, 94b** of Dietz meet the claim of an open inlet that is “open in the horizontal direction.” (i.e., draw a horizontal line at the top of chambers **94a, 94b** to define the open inlet).

Regarding claim 5, an outlet from a return duct of external circulation (i.e., the outlets of external conduits **58a**, **58b**, carrying solid material from separators **40a**, **40b**; FIG. 1, 2) is provided at or above inlet chamber **94a**, **94b**.

Regarding claims 7 and 8, Dietz discloses the at least one process chamber **92a**, **92b**, **96a**, **96b** and the at least one inlet chamber **94a**, **94b** are arranged next to each other (see FIG. 2), wherein each inlet chamber **94a**, **94b** is arranged side by side with one process chamber **92a**, **92b**, **96a**, **96b** so as to form at least one set of chambers.

Regarding claim 9, Dietz (FIG. 2) discloses a first process chamber (e.g., chamber **92a**) is provided on one side of each inlet chamber (e.g., chamber **94a**) and a second process chamber (e.g., chamber **96a**) is provided on another side of each inlet chamber **94a** so as to form a set of chambers **92a-94a-96a**, and wherein each inlet chamber **94a** is arranged to deliver solid material to the first and second process chambers **92a** and **96a**.

Regarding claim 10, Dietz (FIG. 2) discloses one process chamber (e.g., process chamber **96a** or **92b**) is positioned between two inlet chambers (i.e., chambers **94a** and **94b**) so as to form a set of chambers **94a-96a/92b-94b**, and wherein the two inlet chambers **94a**, **94b** are arranged to deliver solid material to the one process chamber **96a/92b**.

Regarding claims 12 and 14, Dietz (FIG. 2, 4) discloses, one inlet chamber (e.g., chamber **94a**) is provided between a first process chamber (e.g., chamber **92a**) and a second process chamber (e.g., chamber **96a**) so as to form a set of chambers; division walls (i.e., partitions **88a**, **90a**) separate the first and second process chambers **92a**, **96a** from the one inlet chamber **94a** and the division walls are arranged substantially perpendicular to the at least one wall;

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inlets (i.e., openings **112a**, **114a**; see FIG. 4) to the first and second process chambers **92a**, **96a** are provided at lower parts of the division walls **88a**, **90a**;

said set of chambers **92a-94a-96a** including a common front wall (i.e., partition **68a**; see FIG. 2) arranged substantially parallel to the at least one wall;

outlets (i.e., openings **106a**, **110a**; see FIG. 4) of the first and second process chambers **92a**, **96a** are arranged in the upper part of the front wall **68a**; and

an outlet of the external circulation of the solid material from a return duct (i.e., the outlet of external conduits **58a**, carrying solid material from separators **40a**; FIG. 1, 2) is arranged in the at least one wall (i.e., wall **16a**) at or above the open top of the inlet chamber **94a**.

Regarding claim 17, Dietz (FIG. 4) discloses the at least one inlet chamber **94a**, **94b** is provided with a grid (i.e., plate **22a**, **22b**) including means for fluidizing the interior of the at least one inlet chamber (i.e., nozzles **98a**, **98b**) by means of a fluidizing medium fed from a windbox below the grid (i.e., plenum **28a**, **28b**).

Regarding claim 19, Dietz (FIG. 4) discloses the at least one inlet chamber **94a**, **94b** is provided with a grid (i.e., plate **22a**, **22b**) including means for fluidizing the interior of the at least one inlet chamber (i.e., nozzles **98a**, **98b**) by means of a fluidizing medium fed from a windbox below the grid (i.e., plenum **28a**, **28b**), the windbox being divided into separate sections, each of said sections having its own means for fluidizing medium feed (i.e., separate plenum sections **28a** and **28b**).

Regarding claims 20 and 21, Dietz (FIG. 4) discloses the inlet of at least one inlet chamber **94a**, **94b** is provided with means for controlling the flow of the solid material into the inlet, the means comprising a segmented area having its own fluidizing air supply means (i.e.,

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taller nozzles **100a**, **100b**, with manifold **102a**, **102b**; column 8, lines 11-28).

Regarding claim 23, Dietz (FIG 2) discloses the at least one set of chamber comprises two sets of chambers (e.g., a first set comprising inlet chamber **94a** and processing chamber **96a**, and a second set comprising inlet chamber **94b** and process chamber **92b**) provided side by side adjacent to the rear wall (i.e., wall **16a**, **16b**) of the reactor furnace, wherein a particle separator system (i.e., comprising separators **40a**, **40b**; conduits **58a**, **58b**; column 8, lines 11-28) in connection with the external circulation of solid material is divided to feed the flow of solid material to said two sets of chambers.

Regarding claims 25 and 26, Dietz (FIG. 2) discloses the at least one process chamber **92a**, **92b**, **96a**, **96b** and the at least one inlet chamber **94a**, **94b** have a rear wall (i.e., wall **16a**, **16b**) that is formed by the at least one wall of the furnace.

Instant claims 5, 7-10, 12, 14, 17, 19-21 are 23-26 structurally read on the apparatus of Dietz.

#### ***Claim Rejections - 35 USC § 103***

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.


5. Claims 4, 5, 7, 17, 20, 21, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyppanen (WO 97/46829).

Regarding claim 24, Hyppanen (FIG. 2 embodiment; page 13, line 31 to page 14, line 10; also, see page 11, line 1 to page 13, line 30) discloses a system including at least one process chamber (i.e., heat transfer chamber **218**) in connection with a fluidized bed reactor (i.e., reactor or processing chamber **212**), wherein process chamber **218** comprises:



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an interior limited by side walls having a lower part and an upper part (as illustrated in FIG. 2, a left partition wall **238** and a right partition wall, not labeled), wherein the interior enables a flow of solid material;

heat exchanger means (i.e., heat transfer surfaces, not labeled in FIG. 2, but indicated by shape ; equivalent to heat transfer surfaces **46** in FIG. 1) provided within the interior for heat transfer from the flow of the solid material to a heat transfer medium inside the heat exchanger means (see page 1, lines 31-34);

a top closed barrier wall forming a roof of the at least one process chamber **218** (see angled wall shown in FIG. 2);

a process chamber inlet (i.e., the opening, not labeled in FIG. 2, located at the bottom part of partition **238**) arranged in the lower part of one of the side walls; and

a process chamber outlet (i.e., opening **250**) arranged in the upper part of the other side wall;

wherein the fluidized bed reactor comprises:

a furnace and furnace walls limiting the furnace (i.e., reactor or processing chamber **212** defining a combustion chamber, having walls, not labeled, limiting reactor chamber **212**), wherein the at least one process chamber **218** is located adjacent to at least one wall of the furnace walls (i.e., adjacent to a shared exterior wall; see FIG. 2); and

at least one inlet chamber (i.e., dilution chamber **216**; page 5, line 37 to page 6, line 11) for directing solid material to the process chamber inlet, wherein the inlet chamber **216** is disposed prior to the process chamber **218** in the direction of flow of solid material (see arrows in FIG. 2), and wherein the inlet chamber **216** extends in a vertical direction and ends in an open inlet (i.e., as seen in FIG. 2, the chamber **216** substantially defines a

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rectangle having an open top), wherein the open inlet is arranged to receive the flow of solid material from the reactor chamber **212** via opening **226**.

In view of the newly added limitations, the open inlet of the inlet chamber **216** is further “open in the horizontal direction”, according to Applicant’s specification. The specification (page 7, lines 12-14) recites, “The inlet **22** of the inlet chamber **7** is substantially or totally open in the horizontal direction to allow the particles freely to enter the inlet chamber **7**.” As best understood, it appears that the limitation of “open in the horizontal direction” means having an opening that is defined within the horizontal plane (see FIG. 3, 7, 8). Thus, the open top of the inlet chamber **216** of Hyppanen meets the claim of an open inlet that is “open in the horizontal direction.” (i.e., draw a horizontal line at the top of chamber **216** to define the inlet).

As illustrated in FIG. 2, process chamber **218** and inlet chamber **216** are contained within a common housing **219**, located adjacent to the reactor chamber **212**. Thus, the common housing **219** which contains the process chamber **218** and the inlet chamber **216** is not shown as being located “inside the furnace of the fluidized bed reactor” as instantly claimed. However, Hyppanen further discloses,

“The heat transfer chamber may be connected in various ways and various locations to the processing chamber so that there is solid particle exchange between the chambers. The heat transfer chamber may in some special case even be formed within the processing chamber itself.” (see page 1, lines 17-22).

“Additional heat transfer surfaces are often arranged in a separate heat transfer chamber (HTC), which may be a part of the processing chamber, a separate chamber adjacent to the processing chamber or, in circulating fluidized bed reactors, part of the solid particles recycling system.” (see page 2, lines 5-10).

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Hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made to locate the common housing which contains the process chamber and the inlet chamber inside the furnace of the fluidized bed reactor in the system of Hyppanen, on the basis of suitability for the intended use, because the shifting of the location of parts would involve routine skill in the art, as evidenced by the teachings of Hyppanen, above.

Regarding claim 4, Hyppanen discloses the top closed barrier wall of chamber 218 is arranged such that the solid material flows down onto the top of the top closed barrier wall (i.e., via opening 226) wherein the top closed barrier wall is inclined so as to guide the solid material to the open inlet at the top of the inlet chamber 216 (see FIG. 2).

Regarding claim 5, the embodiment of FIG. 2 shows a means for conducting internal circulation located at or above the open top of the inlet chamber 216 (i.e., via opening 226), but the embodiment lacks an outlet from a return duct of external circulation located at or above the open top of the inlet chamber 216. Hyppanen, however, discloses,

“... it is possible to combine embodiments shown above and *introduce solid particles from an external solid particle circulation, via a return duct, and/or directly from the reactor chamber from the internal solid particle circulation therein, to the dilution chamber.* At high load solid particles may be introduced solely or mainly through the return duct... At low load conditions solid particles may be introduced solely or mainly from the internal circulation through outlet openings at lower levels in the reactor chamber walls.” (emphasis added; page 17, lines 10-26).

Hence, it would have been obvious for one of ordinary skill in the art at the time the invention was made to further provide an outlet from a return duct of external circulation to the open inlet at the top of the inlet chamber 216 in the modified apparatus of Hyppanen, on the basis of suitability for the intended use, because the addition of an external solid particle circulation

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would support the operation of the reactor system under both high and low load conditions, as taught by Hyppanen above.

Regarding claim 7, Hyppanen (FIG. 2; page 5, line 37 to page 6, line 11) discloses the at least one process chamber **216** and at least one inlet chamber **218** are arranged next to each other.

Regarding claim 17, Hyppanen discloses the at least one inlet chamber **216** is provided with a grid (i.e., not labeled in FIG. 2, but equivalent to grid **36** in FIG. 1) including means for fluidizing the interior of the at least one inlet chamber **216** by means of a fluidizing medium fed from a windbox below the grid (page 12, lines 12-19; page 13, lines 1-12).

Regarding claims 20 and 21, Hyppanen (FIG. 2) discloses the open top of the inlet chamber **216** is provided with means for controlling the flow of the solid material into the one or more inlet chambers, the means comprising a segmented area having its own fluidizing air supply means (i.e., a separate fluidizing means below the grid, not labeled, for chamber **216**; page 12, second paragraph).

Regarding claim 25, Hyppanen (FIG. 2) discloses the at least one process chamber **218** and the at least one inlet chamber **216** have a rear wall that is formed by the at least one wall of the furnace (e.g., as illustrated, the facing or rear wall of the reactor).

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dietz (US 5,299,532) in view of Hyppanen (WO 97/46829).

Dietz (FIG. 4) discloses one process chamber (e.g., chamber **96a**, **92b**) is provided between a first inlet chamber **94a** and a second inlet chamber **94b** so as to form a set of chambers. Dietz, however, is silent as to the first inlet chamber **94a** being connected to an internal circulation of the solid material, and the second inlet chamber **94b** being connected to an

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external circulation.

Hyppanen discloses a system similar to the system of Dietz, wherein the system of Hyppanen (FIG. 2) comprises at least one process chamber (i.e., heat transfer chamber **218**) in connection with a fluidized bed reactor (i.e., reactor or processing chamber **212**), and an inlet chamber (i.e., dilution chamber **216**) for directing solid material to the process chamber, wherein the inlet chamber **216** is disposed prior to the process chamber **218** in the direction of flow of the solid material (see flow arrows in FIG. 2), and wherein the at least one inlet chamber **216** extends in a vertical direction (see also page 5, line 37 to page 6, line 11) and ends in an open top (i.e., defined by reactor chamber outlet **226**), wherein the open top is arranged to receive an internal flow of solid material from the reactor chamber **212**. Hyppanen teaches,

“...it is possible to combine embodiments shown above and introduce solid particles from an external solid particle circulation, via a return duct, *and/or* directly from the reactor chamber from the internal solid particle circulation therein, to the dilution chamber. At high load solid particles may be introduced solely or mainly through the return duct, and outlet openings at lower levels in the reactor chamber may function as openings for recycling countercurrently by overflow superfluously discharged solid material back into the reactor chamber. At low load conditions solid particles may be introduced solely or mainly from the internal circulation through outlet openings at lower levels in the reactor chamber walls.” (page 17, lines 10-26).

Thus, depending on whether the reactor system were operating under high or low load conditions, it would have been obvious for one of ordinary skill in the art at the time the invention was made to configure the first inlet chamber **94a** to be connected to an internal circulation of solid material and to configure the second inlet chamber **94b** to be connected to an external circulation of solid material in the apparatus of Dietz, on the basis of suitability for the

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intended use, because the addition of the means for internal solid particle circulation to the inlet chamber would support the operation of the reactor system under both high and low load conditions, as taught by Hyppanen, above.

***Response to Arguments***

7. Applicant's arguments filed on July 18, 2005 have been fully considered but they are moot in view of the new ground(s) of rejection, as necessitated by amendment.

***Allowable Subject Matter***

8. Claims 13, 18 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose or adequately teach a system further comprising the recited inlet chamber wall configuration of claim 13, wherein the top closed barrier walls of the first and second process chambers are inclined in a manner such that the top closed barrier walls slant towards the open top of the inlet chamber. In addition, the prior art does not disclose or adequately teach the claimed configuration of a fluidizing air supply means comprising a U-shaped tube system and a U-shaped groove such that solid material from an internal circulation coming down the top closed barrier wall is forced to enter the furnace.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer A. Leung

September 23, 2005 *JAL*

*Hien Tran*

**HIEN TRAN  
PRIMARY EXAMINER**